SECTION 12347

METAL LABORATORY CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Standard metal laboratory casework.
   2. Laboratory utility-space framing.
   3. Laboratory countertops.
   4. Laboratory sinks.
   5. Accessories.
   6. Eyewash service fittings.

B. Related Sections:
   1. Division 6 Section "Miscellaneous Carpentry" for wood blocking for anchoring laboratory casework.
   2. Division 9 Section "Gypsum Board Assemblies" for reinforcements in gypsum board partitions for anchoring laboratory casework.
   3. Division 9 Section "Resilient Wall Base and Accessories" for resilient base applied to metal laboratory casework.
   4. Division 11 Section "Laboratory Fume Hoods" for fume hoods.
   5. Division 15 and 16 Sections for service fittings.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal laboratory casework capable of withstanding the following loads without permanent deformation, excessive deflection, or binding of drawers and doors:
   1. Shelves of Base, Wall, and Storage Cabinets: 200 lb.
   2. Drawers: 150 lb.
   3. Wall Cabinets: 150 lb/ft.
   4. Floor-Supported Base Cabinets: 100 lb/ft. within cabinets, 75-lb/ft. countertop.

1.4 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: For metal laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
   1. Indicate locations of blocking and other supports required for installing casework.
   2. Indicate locations and types of service fittings, together with associated service supply connection required.
   3. Include details of utility spaces showing supports for conduits and piping.
   4. Show adjacent walls, doors, windows, other building components, and other laboratory equipment. Indicate clearances from above items.
   5. Include coordinated dimensions for laboratory equipment specified in other Sections.

C. Samples for Verification: 6-inch- square samples for each type of finish, including top material.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated without delaying the Work, as documented according to ASTM E 548.

B. Source Limitations: Obtain laboratory casework, including tops, sinks, service fittings, and accessories, through one source from a single manufacturer.
   1. Obtain through same source from the same manufacturer as fume hoods specified in Division 11 Section "Laboratory Fume Hoods."

C. Product Designations: Drawings indicate sizes and configurations of casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes, similar door and drawer configurations, and complying with the Specifications may be considered.

D. Flammable Liquid Storage: Where cabinets are indicated for solvent or flammable liquid storage, provide units that are listed and labeled as complying with the requirements of NFPA 30 for design, construction, and capacity of storage cabinets by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver laboratory casework until painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions" Article below.

B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels through remainder of construction period.

1.8 COORDINATION

A. Coordinate layout and installation of metal framing and reinforcement in gypsum board assemblies for support of metal laboratory casework.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Metal Laboratory Casework:
      a. Duralab Equipment Corp.
      b. Fisher Hamilton Scientific, Inc.
      c. Kewaunee Scientific Corp.; Laboratory Division.
      d. Lab Fabricators Co.
      e. Norlab, Inc.
      f. Unicor
   2. Epoxy Tops, Sinks, and Troughs:
      a. Durcon Company, Inc. (The).
      b. Laboratory Tops, Inc.

2.2 MATERIALS

A. Metal: Commercial-quality, cold-rolled, carbon-steel sheet, complying with ASTM A 366; matte finish; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness.

B. Minimum Metal Thickness: Provide metal laboratory furniture components of the following minimum thicknesses:
   1. Sides, ends, fixed backs, bottoms, tops, soffits, and items not otherwise indicated: 0.0478 inch. Except for flammable liquid storage cabinets, bottoms may be 0.0359 inch if reinforced.
   2. Back panels, doors, drawer fronts and bodies, and shelves: 0.0359 inch. For back panels and doors for flammable storage cabinets, use 0.0478 inch thick metal. For shelves more than 36 inches long, use 0.0478 inch thick metal or provide suitable reinforcement.
   3. Intermediate horizontal rails, table aprons and cross rails, center posts, and top gussets: 0.0598 inch.
   4. Drawer runners, sink supports, and hinge reinforcements: 0.0747 inch.
   5. Leveling and corner gussets: 0.1046 inch.

C. Acid Storage-Cabinet Lining: ¼ inch thick, polypropylene, epoxy, or phenolic-composite lining material.

2.3 FABRICATION

A. General: Complete assembly and finish work at point of manufacture. Perform assembly on precision jigs to provide units which are square; fully reinforced with angles, gussets, and channels; and integrally framed and welded to form a dirt and vermin-retardant enclosure. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch.

B. Fabricate units on precision dies for interchangeability of like-size drawers, doors, and similar parts.

C. Flush Doors: Outer and inner pans formed and telescoped into box formation, with channel reinforcements full height on center of each pan. Fill doors solid with noncombustible, sound-deadening material.

D. Hinged Doors: Mortise at flanges for hinges and reinforce with angles, welded inside inner pans at hinge edge.

E. Drawers: Assemble fronts from telescoping outer and inner pans, designed to eliminate raw edge of steel at top. Fabricate sides, back, and bottom of one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal. Weld drawer front to sides, back, and bottom to form a single, integral unit. Provide drawers with rubber bumpers, runners, and positive stops to prevent metal-to-metal contact or accidental removal.

F. Adjustable Shelves: Front, back, and ends formed down with returned lip at front and back.

G. Toe Space: Provide metal toe space, fully enclosed, 4 inches high by 3 inches deep, with no open gaps or pockets.

H. Table Legs: Not less than 2 inch square, electrically welded tubing. Provide leg stretchers where necessary to comply with structural performance requirements. Weld or bolt leg stretchers to legs and cross-stretchers. Securely bolt legs to table aprons. Provide leveling device welded to bottom of each leg.

I. Leg Shoes: Vinyl or rubber, black, open-bottom type.

J. Utilities: Provide space, cutouts, and holes for pipes, conduits, and fittings in cabinet bodies to accommodate utility services and their support-strut assemblies.

K. Utility-Space Framing: Manufacturer's standard steel framing units consisting of 2 cold-rolled C-channel uprights, not less than 1-5/8 inches square by 0.10 inch thick, connected together at the top and bottom by U-shaped brackets made from 1-1/4-by-1/4-inch flat bars. Framing units may be made by welding C-channel material specified for uprights into rectangular frames instead of using U-shaped brackets.

L. Base Molding: Extruded vinyl or rubber, black, 4 inches high. Provide on fronts and exposed ends and backs of floor-mounted casework.

M. Filler Strips: Provide as needed to close space between cabinets and walls, ceilings, and indicated equipment. Fabricate from the same material and with the same finish as cabinets. Hem exposed edges.

2.4 FINISH FOR METAL LABORATORY CASEWORK

A. Pretreatment: After assembly, thoroughly clean surfaces of grease, dirt, oil, flux, and other foreign matter by physical and chemical means. Treat entire unit with metallic phosphate process, leaving surfaces with uniform, fine-grained, crystalline phosphate coating to provide bond for finish.

B. Chemical-Resistant Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, chemical-resistant, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil for topcoat and 2 mils for system.

C. Chemical and Physical Resistance of Finish System: Provide metal laboratory casework with finish system complying with the following requirements for chemical and physical resistance:
   1. Chemical Resistance: Capable of withstanding application of not less than 5 drops (0.25 mL) of the following reagents applied to finish surface; covered with a watch glass for 60 minutes, rinsed, and dried; with no permanent change in gloss, color, film hardness, adhesion, or film protection.
      a. Acetic acid (98 percent).
      b. Hydrochloric acid (37 percent).
      c. Nitric acid (25 percent).
      d. Phosphoric acid (75 percent).
      e. Sulfuric acid (85 percent).
      f. Acetone.
      g. Benzene.
      h. Carbon tetrachloride.
      i. Ethyl acetate.
      j. Ethyl alcohol.
      k. Ethyl ether.
      l. Formaldehyde (37 percent).
      m. Furfural.
      n. Methyl ethyl ketone.
      o. Phenol (85 percent).
      p. Toluene.
      q. Xylene.
      r. Ammonium hydroxide (28 percent).
      s. Potassium hydroxide (40 percent).
      t. Sodium carbonate (saturated).
      u. Sodium chloride (saturated).
      v. Sodium hydroxide (25 percent)
      w. Sodium sulfide (saturated).
      x. Zinc chloride (saturated).
   2. Moisture Resistance: No visible effect when exposed to the following:
      a. Hot water at a temperature of 190 to 205 deg F, trickled down the surface at a 45-degree angle for 5 minutes.

b. Constant moisture using a 2-by-3-by-1-inch cellulose sponge, soaked with water, in contact with surface for 100 hours.

3. Cold Crack: No effect when subjected to 10 cycles of temperature change from 20 deg F for 60 minutes to 125 deg F for 60 minutes.

4. Adhesion and Flexibility: No peeling or cracking or exposure of metal when metal is bent 180 degrees over a ½ inch diameter mandrel.

D. Colors: Comply with the following requirements for colors of metal laboratory casework finish:

1. Colors: As indicated by manufacturer's color designations.

2.5 CASEWORK HARDWARE

A. Hardware, General: Provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA 156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors less than 48 inches high and 3 for doors more than 48 inches high.

C. Pulls: Solid aluminum, stainless steel, or chrome-plated brass, fastened from back with 2 screws. For sliding doors, provide stainless-steel or chrome-plated recessed flush pulls. Provide 2 pulls for drawers more than 24 inches wide.

D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.

E. Drawer Guides: Metal-channel, self-closing drawer guides, designed to prevent rebound when drawers are closed, with nylon-tired, ball-bearing rollers, and complying with BHMA A156.9, Type B05091.

F. Label Holders: Stainless steel or chrome plated, sized to receive standard label cards approximately 1 by 2 inches, attached with screws or rivets.

1. Provide on all drawers.

G. Drawer and Cupboard Locks: Half-mortise or cylindrical type, 5-pin tumbler and dead bolt or cam, only cylinder exposed, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.

1. Provide minimum of 2 keys per lock and 6 master keys.
2. Provide on all drawers and doors.

2.6 TOPS, SINKS, AND TROUGHS

A. Tops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Make exposed edges and corners uniformly beveled. Provide front and end overhang of 1 inch over base cabinets, formed with continuous drip groove on underside 1/2 inch from edge.

B. Sinks, General: Provide sizes indicated or manufacturer's closest standard size of equal or greater volume, as approved by Architect.

1. Outlets: 1-1/2-inch NPS outlets with strainers and tailpieces a minimum of 6 inches long, of the same material as sink, or as otherwise approved by CM.
2. Overflows: For each sink, except cup sinks, provide overflow of standard beehive or open-top design and with separate strainer. Height 2 inches less than sink depth. Provide in the same material as sink.

C. Epoxy Tops, Sinks, and Troughs: Factory molded of modified epoxy-resin formulation, uniform mixture throughout full thickness with smooth, nonspecular finish.

1. Physical Properties: Comply with the following minimum requirements:
   a. Flexural strength: 15,000 psi.
   b. Compressive strength: 30,000 psi.
   c. Hardness (Rockwell M): 100.

d. Water absorption (24 hours): 0.02 percent (maximum).
e. Heat distortion point: 350 deg F.
f. Thermal-shock resistance: Highly resistant.

2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, test procedure 3.9.5:
   a. Acetone: Moderate effect.
   b. Acetic acid (98 percent): No effect.
   c. Hydrochloric acid (37 percent): No effect.
   d. Nitric acid (70 percent): No effect.
   e. Phosphoric acid (85 percent): No effect.
   f. Sulfuric acid (33 percent): No effect.
   g. Benzene: No effect.
   h. Butyl alcohol: No effect.
   i. Carbon tetrachloride: No effect.
   j. Ethyl acetate: No effect.
   k. Ethyl ether: No effect.
   l. Formaldehyde: No effect.
   m. Phenol (85 percent): No effect.
   n. Xylene: No effect.
   o. Ammonium hydroxide (28 percent): No effect.
   p. Sodium hydroxide (50 percent): Moderate effect.
   q. Zinc chloride: No effect.
3. Colors: Provide products that result in colors complying with the following requirements:
   a. Color: Black.
4. Top Fabrication: Fabricate with factory cutouts for sinks and with plain butt-type joints assembled with epoxy adhesive and prefitted, concealed metal splines.
   a. Top Configuration: Square edge with drip groove and integral coved backsplash.
   b. Top Thickness: 1-1/4 inches .
5. Sink Fabrication: Molded in one piece with surfaces smooth, corners coved and bottom sloped to outlet; 1/2-inch minimum thickness.
   a. Provide sinks with 1/4-inch- thick lip around perimeter of sink for drop-in installation.
   b. Bond epoxy sinks installed in epoxy tops to tops and finish to produce an integral unit with invisible joint line.

D. Cup Sinks: Epoxy, 3-by-6-inch nominal size.

E. Cup Sinks: Epoxy, polypropylene, glass, or stainless steel, as indicated on Drawings.

F. Troughs: Epoxy or stainless steel, as indicated. Comply with requirements for materials and construction as specified for tops or sinks. Pitch to drains not less than 1/8 inch/foot.

2.7 SOLVENT STORAGE CABINETS

A. Top, bottom and sides: 18 gauge steel, double wall construction with 1-1/2" air space, removable access and back panels; all joints welded. Set bottom of door two inches above bottom of cabinet to create a two inch deep well to contain spillage of liquids.
   1. Provide non-venting cabinets.

B. Hardware:
   1. 3 point latching device and lock.
   2. Full length piano hinge.
   3. Door operation: Manual.

C. Cabinet grounding attachment: Screw at base of cabinet for firm attachment of grounding wire.
   1. Mark with Factory Mutual approval and storage capacity.
   2. Warning signs: Label cabinet: "FLAMMABLE - KEEP FIRE AWAY".

2.8 ACCESSORIES

A. Reagent Racks: Single- or double-faced units as indicated, fabricated to suit type and composition of top.

B. Wall Shelving: Provide wall shelving of materials indicated and as follows:
   1. Plastic-Laminate Shelving: Plastic-laminate sheet complying with NEMA LD 3, Grade GP 28, shop bonded with fully waterproof glue to both sides and both edges of 3/4-inch- thick particleboard. Sand surfaces to which plastic laminate is to be bonded.
   2. Color, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed shelf surfaces complying with the following requirements:
      a. Provide CM's selections from manufacturer's full range of colors and finishes.
   3. Adjustable Shelf Supports: Surface-type steel standards and steel shelf brackets, with epoxy powder-coated finish, complying with BHMA A156.9, Types B04102 and B04112.

C. Upright Rod Assembly and Metal Crossbar: Aluminum or stainless steel. Two vertical rods and 1 horizontal crossbar, ¾ inch diameter and 36 inches long, unless otherwise indicated; 2 flush socket receptacles and 2 crossbar clamps. Taper ends of vertical rods to fit receptacles; all other rod ends are rounded.

D. Burette Rods: Aluminum or stainless-steel rods, ½ inch diameter and 18 inches long, threaded on 1 end to fit tapered plug adapter for flush socket receptacle. Provide with tapered plug adapter and receptacle.

E. Greenlaw Arm Assembly: Aluminum or stainless-steel vertical rod, tapered on one end to fit flush socket receptacle. Adjustable crossbar of hardwood with black, acid-resistant finish, secured to upright with adjustable clamp. Provide with receptacle.

F. Lattice Assembly: Aluminum or stainless-steel, vertical and horizontal rod lattice assembly with ¾ inch diameter rods at approximately 12 inches o.c. with 2 flush socket receptacles for mounting.
   1. Size: 36 inches wide by 36 inches high.

G. Pegboards: Polypropylene, epoxy, or phenolic-composite pegboards with polypropylene pegs and stainless-steel drip troughs.

2.9 WATER AND LABORATORY GAS SERVICE FITTINGS

A. Service Fittings: Provide units that comply with SEFA 7, "Laboratory and Hospital Fixtures Recommended Practices." Provide fittings complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handle extension rods, and similar items.

B. Material and Finish: Fabricate service fittings from cast or forged red brass, unless otherwise indicated.
   1. Finish exposed surfaces, including fittings, escutcheons, and trim, with a polished chrome-plating, unless otherwise indicated.
   2. Finish exposed surfaces, including fittings, escutcheons, and trim, with acid- and solvent-resistant, baked-on plastic coating in manufacturer's standard metallic brown, aluminum, or other color as approved by the CM.
   3. For reagent-grade water service fittings, provide polypropylene, PVC, or polyvinylidene fluoride for parts in contact with water.

C. Water Valves and Faucets: Provide units complying with ASME A112.18.1M, with renewable seats, designed for working pressure up to 125 psig.
   1. Vacuum Breakers: Provide vacuum breakers on water fittings with serrated outlets.
   2. Aerators: Provide aerators on water fittings that do not have serrated outlets.
   3. Self-Closing Valves: Provide self-closing valves where indicated.

D. Ground-Key Cocks: Tapered core and handle of one-piece forged brass, ground and lapped, held in place under constant spring pressure. Provide units designed for working pressure up to 40 psig. Provide with serrated outlets.

E. Needle Valves: Provide units with renewable, self-centering, floating cones and renewable seats of stainless steel or Monel metal. Provide with removable serrated outlets.
   1. Provide units designed for working pressure up to 60 psig.

F. Hand of Fittings: Furnish right-hand fittings unless fitting designation is followed by "L."

G. Remote-Control Valves: Provide needle valves, straight-through or angle type as indicated for fume hoods and where indicated.

H. Handles: Provide 3- or 4-arm, forged-brass handles for valves, unless otherwise indicated.
   1. For ground-key cocks, provide lever-type handles.
   2. For needle valves, provide knurled nylon handles.

I. Service-Outlet Identification: Provide color-coded plastic discs, with embossed identification, secured to each service-fitting handle to be virtually tamperproof.

2.10 ELECTRICAL SERVICE FITTINGS

A. Service Fittings, General: Provide UL-labeled units complying with Division 16 Sections, complete with metal housings, receptacles, terminals, switches, pilot lights, device plates, and accessories and gaskets required for mounting on casework.

B. Receptacles: Provide Hospital Grade, 2-pole, 3-wire grounding devices rated at 15 A, 125 V, ac.
   1. GFCI Receptacles: Provide ground-fault circuit interrupter duplex receptacles where indicated and when located in units containing water supplies or sinks.
   2. TVSS Receptacles: Provide duplex, hard-wired, transient voltage surge suppressor receptacles where indicated.

C. Switches: Provide single-pole, double-pole, or 3-way switches, as required; rated 120 to 277 V, ac; and in amperage capacities to suit units served.
   1. Provide pilot lights adjacent to toggle switch, where noted as "PL" next to switch identification.
   2. Provide thermal-overload switches, single or double pole, as required, with maximum overcurrent trip setting to suit particular motor controlled.

D. Line-Type Fittings: Provide with cast-metal boxes with threaded holes for mounting on rigid steel conduit. Provide cover plates the same size as boxes.

E. Recessed-Type Fittings: Provide with galvanized steel boxes.

F. Finishes for Service-Fitting Components: Furnish housings or boxes for pedestal- and line-type fittings with manufacturer's standard baked-on, chemical-resistant enamel in color as selected by Architect from manufacturer's full range of colors.
   1. Provide ivory- or brown-colored receptacles and switches as selected by Architect.

G. Cover Plates: Provide satin finish, Type 302 or 304, stainless-steel cover plates with formed, beveled edges.

H. Cover-Plate Identification: Provide identification on cover plates at receptacles, switches, terminal posts, and other locations as indicated. Provide 1/4-inch- high letters, unless otherwise indicated.
   1. Provide identification on the following devices whether indicated on Drawings or not:
      a. Receptacles, other than standard 125-V duplex, grounding type. Indicate voltage and phase.
      b. Switches and thermal-overload switches. Indicate equipment being controlled.
      c. Pilot lights when located remotely from associated equipment or switch, where function is not obvious. Indicate equipment being controlled.

2. On stainless steel, stamp or etch directly on plate and fill in letters with black enamel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcement, and other conditions affecting performance of metal laboratory casework installation.
   1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION

A. Install plumb, level, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Utility-Space Framing: Secure to floor with 2 fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.

C. Base Cabinets: Set cabinets straight, plumb, and level. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
   1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than 2 fasteners.

D. Wall Cabinets: Hang cabinets straight, plumb, and level. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches o.c. Align similar adjoining doors to a tolerance of 1/16 inch.

E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises, unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

F. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF TOPS

A. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project site processing of top and edge surfaces is not required. Locate field joints where shown on approved Shop Drawings.

B. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection. Provide flush hairline joints in tops using clamping devices.
   1. Where necessary to penetrate tops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to top in chemical resistance, hardness, and appearance.

C. Provide required holes and cutouts for service fittings.

D. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Provide scribe moldings for closures at junctures of top, curb, and splash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent

casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

3.4 INSTALLATION OF SINKS

A. Underside Installation: Use manufacturer's recommended adjustable support system for table- and cabinet-type installations.

B. Set top edge of sink unit in sink and top manufacturers' recommended chemical-resistant sealing compound and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement.

C. Semiflush Installation: Use stainless-steel sink frame, complete with clamping lugs and pads. Before setting, apply a full coat of sink and top manufacturers' recommended sealant under rim lip and along top. Omit sink frame if sink is fabricated with an integral rim seal.

D. Drop-in Installation: Rout groove in top to receive sink rim if not prepared in shop. Set sink in adhesive and fill remainder of groove with sealant or adhesive. Use procedures and products recommended by sink and top manufacturers. Remove excess adhesive and sealant while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF ACCESSORIES

A. Install accessories according to approved Shop Drawings and manufacturer's written instructions.

B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.

C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

3.6 CLEANING AND PROTECTING

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Construction Manager.

C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at minimum of 48 inches o.c.

END OF SECTION 12347